PPE for Testing on Line-Cord Equipment

The Laboratory Electrical Safety Committee provides the following information regarding work on equipment powered through a 120-volt line-cord.

BNL requires that Personal Protective Equipment (PPE) be used during test and adjustment of electrical equipment operating over 50 volts, to protect against the two hazards of electric shock and arc flash. Selection of appropriate PPE may be determined by using the two tables in the PPE Manual, available on the SBMS web site.

Protection against shock hazards

The first table in the PPE manual, *Table 130.7(C)(9)(a) Hazard/Risk Category Classifications*, requires use of voltage-rated gloves and leather glove protectors during test and adjustment of equipment operating at 120 volts, whenever a handheld probe will be used to contact an energized part.

Use of gloves may be avoided by unplugging the equipment, temporarily connecting the test meters while the circuit is de-energized, plugging the equipment in and turning it on, making tests and adjustments, turning off the equipment, and removing the test meters.

Protection against arc flash hazards

Arc flash is the other hazard associated with testing energized equipment. The first table in the PPE manual identified work on energized 120-volt parts, including voltage testing, as arc flash Hazard/Risk Category 1 task. Protection against the effects of an arc flash may be determined by referring to the second table in the PPE manual, *Table 130.7(C)(10) Protective Clothing and Personal Protective Equipment (PPE) Matrix*. Such work is Hazard/Risk Category 1 and requires a long-sleeve flame-retardant shirt (with a minimum Arc Rating of 4 cal/cm^2), long denim pants, safety glasses, and a hard hat.

Reduced PPE requirements may be used if the Hazard/Risk Category can be reduced from Category 1 to Category 0. A footnote to the first table allows this reduction for conditions where less than 10 kA short circuit current is available (for a short circuit clearing time of two line cycles). If the equipment under test is connected to a 120-volt receptacle by an AWG 16 or 14 line cord at least three feet long, or AWG 12 at least six feet long, then the maximum fault current that can be delivered at the equipment end of the cord is less than 10 kA.

The resulting reduction in Hazard/Risk to Category 0 by this analysis requires using only a long-sleeve shirt and long pants both of natural-fiber, and safety glasses. The reduced PPE requirement eliminating the hard hat and backing off requirements for shirt and pants may make testing and troubleshooting of line-cord equipment more convenient. If the equipment has a shorter cord, then an extension cord may be used in conjunction with the equipment cord to provide the required circuit length.

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For the Laboratory Electrical Safety Committee,

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